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Parthenogenesis in Bennettites.—Parthenogenesis, or the development of an embryo from an egg without fertilization, has been demonstrated for several angiosperms, and is claimed for *Pinus pinaster* and *Gnetum Ule*. In spite of the difficulty of proving a case of parthenogenesis in living seed plants, LIGNIER¹³ has given us a short paper with the rather startling title "*Bennettites Morieri* probably reproduces by parthenogenesis." One naturally looks for the evidence. Here it is. He found embryos, but no pollen grains or pollen tubes, and the tip of the nucellus was closed. Some of the sections were in series, at intervals of about 3 mm. Presumably most of the sections were not in series. When one remembers that pollen tubes have never been demonstrated in the Bennettitales and that very possibly the pollen grains may shed their sperms without the formation of a pollen tube, and that even in rather thick sections at intervals of 3 mm., more than nine-tenths of the material is missing, the evidence is not convincing. And yet, this "probable parthenogenesis" is given as a reason for the rapid disappearance of this group during the Cretaceous.—CHARLES J. CHAMBERLAIN.

A classification of conifers.—SAXTON¹⁴ has proposed a classification of conifers based upon the great extension of knowledge of the group developed during recent years. There is no question that the current classifications are archaic, and that a more natural classification of the group is demanded. SAXTON analyzes the characters to be used in such a classification, and discusses the various attempts that have been made. He then describes, with definite characters, five families (Araucariaceae, Podocarpaceae, Pinaceae, Cupressaceae, and Taxaceae), Pinaceae having two subfamilies (Abietoideae and Sciadopitoidae) and Cupressaceae three (Cupressoideae, Callitroideae, and Sequoideae). A consideration of the phylogeny of Coniferales results in an interesting "family tree" that shows the relationships of the families and subfamilies. An interesting item of the phylogeny, at this time, is that the araucarians are represented as the first offshoot from the common stock (presumably abietinean) that arises from Cordaitales, which later gave rise to the podocarps, and then the other families.—J. M. C.

Artificial parthenogenesis in Fucus.—Parthenogenesis in various members of the Phaeophyceae has been known for some time, and unfertilized eggs of *Fucus* have been caused to divide by treating them with solutions. OVERTON¹⁵ took exceptional care to obtain unfertilized eggs of *Fucus vesiculosus*, and each collection was divided into three lots, one of which was then fertilized, another was allowed to remain in normal sea water, while the third was treated with

¹³ LIGNIER O., *Le Bennettites Morieri* (Sap. et Mar.) Lignier se reproduisait probablement par parthénogénèse. Bull. Soc. Bot. France IV. 11:125-127. 1911.

¹⁴ SAXTON, W. T., The classification of conifers. New Phytol. 12:242-262. 1913.

¹⁵ OVERTON, J. B., Artificial parthenogenesis in *Fucus*. Science 37:841, 844. 1913.

acetic or butyric acid. The general result of the various cultures was that in the first case the sporelings developed normally; in the second, no sporelings appeared; while in the third, sporelings developed up to the 25-cell stage. The experiments were not carried farther. No cytological work was done. Since the *Fucus* plant is the 2x generation, it would be interesting to know the chromosome situation, especially if the plants should develop up to the reproductive phase.—CHARLES J. CHAMBERLAIN.

Chromosome conjugation.—Miss FRASER,¹⁶ in a short discussion of chromosome conjugation, cites the work of OVERTON, HARPER, DIGBY, and others to show that it is not a matter of primary importance whether parasynapsis or telosynapsis takes place, and that they need not be mutually exclusive. The sexual nuclei may fuse at once upon fertilization, or not until the division of the oospore in other cases (Pinaceae); while in the extreme case of the rusts they remain distinct until just before meiosis. In like manner the attraction between the homologous chromosomes may bring about their conjugation as soon as the nuclei fuse, or in other cases later, even as late as the formation of the gemini of maturation. The suggestion is made that the clearest cases of Mendelian inheritance will perhaps be found to be those correlated with a late association of the chromosomes in pairs.—L. W. SHARP.

Flora of Boulder.—DANIELS¹⁷ has made a study of the vascular flora of Boulder, Colo., and vicinity, a most interesting mountain region. An introduction (48 pp.) describes the physiography, the climate and rainfall, and the zones of vegetation. The zones given are Campestres, Mensales, Submontanae, Montanae, Subalpestres, and Alpestres, each with numerous subdivisions. The list of plants (211 pp.) includes 1225 numbers in 486 genera, with a statement as to the habitat of each species. A number of new combinations are made, and new species described in *Acomastylis* (*Geum*), *Prunus*, *Vitis*, *Castilleja*, and *Grindelia*. One of the unique features of the list is that a popular name is given for each species. When this reaches such a stage as “filiform toad-flax-leaved painted cup,” it is probable that it ceases to be useful.—J. M. C.

Graft hybrids.—Miss HUME¹⁸ has investigated three graft hybrids for connecting protoplasmic threads. The “periclinal chimaeras” used were *Cytisus Adami*, *Solanum tubigense*, and *S. Koleruterianum*, since in these the epidermis is the only layer of cells belonging to the one component, and the line of demarcation between the two components is therefore a sharp one. BUDER

¹⁶ FRASER, H. C. I., The pairing of the chromosomes. *New Phytol.* 11:58-60. 1912.

¹⁷ DANIELS, FRANCIS POTTER, The flora of Boulder, Colorado, and vicinity. *Univ. Missouri Studies. Science Series* 2: no. 2. pp. xiii+311. 1911.

¹⁸ HUME, MARGARET, On the presence of connecting threads in graft hybrids. *New Phytol.* 12:216-221. 1913.